PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
Gregory P. Einhorn ARG
Morrison & Foerster LLP
12531 High Bluff Drive, Suite 100
San Diego, California 92130-2040

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

	Date of mailing *(day/month/year)* 08 APR 2008
Applicant's or agent's file reference 564462014241	**FOR FURTHER ACTION** See paragraphs 1 and 4 below
International application No. PCT/US 06/46919	International filing date *(day/month/year)* 08 December 2006 (08.12.2006)
Applicant Diversa Corporation	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

   Filing of amendments and statement under Article 19:
   The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

   When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

   Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 740 14 35

   For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

   ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

   ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

   Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

   The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

   Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

   In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

   See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/220 (January 2004)

(See notes on accompanying sheet)

MRDOCKETED: Resp to Srch Rpt
REMINDER: 5-8-2008
FINAL DUE DATE: 6-8-2008 JW

MRDOCKETED: Resp to writt opn
REMINDER: 5-8-2008
FINAL DUE DATE: 7-8-2008 JW

MRDOCKETED: Chapt 2 - 22 mos
REMINDER: _____
FINAL DUE DATE: 7-8-2008

*No corresponding U.S. appls.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 564462014241	**FOR FURTHER ACTION**	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
International application No. PCT/US 06/46919	International filing date *(day/month/year)* 08 December 2006 (08.12.2006)	(Earliest) Priority Date *(day/month/year)* 10 February 2006 (10.02.2006)
Applicant Diversa Corporation		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 6 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

☒ the international application in the language in which it was filed.

☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).

c. ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☒ **Certain claims were found unsearchable** (see Box No. II).

3. ☒ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 8

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 06/46919

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of:

   a. type of material
   - [x] a sequence listing
   - [ ] table(s) related to the sequence listing

   b. format of material
   - [ ] on paper
   - [x] in electronic form

   c. time of filing/furnishing
   - [x] contained in the international application as filed
   - [x] filed together with the international application in electronic form
   - [ ] furnished subsequently to this Authority for the purposes of search

2. [x] In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 06/46919

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☒ Claims Nos.: 105, 128-154, 158 and 159
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

This application contains the following inventions or groups of inventions which are not so linked as to from a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group 1: claims 1-30, 37-40 and 92, directed to a nucleic acid (claims 1-30), an expression cassette and expression vector, a transformed cell (claims 37-40), a method of producing a recombinant polypeptide (claim 92), wherein claims 1 and 2 are limited to SEQ ID NO:1

**********Please see extra sheet**********

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Group I - claims 1-30, 37-40 and 92, wherein claims 1 and 2 are limited to SEQ ID NO:1

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 06/46919

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - C12N 9/42 (2008.01)
USPC - 435/209
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC: 435/209

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(PGPB,USPT,USOC,EPAB,JPAB), Google, PubMed: nucleic acid, nucleotide, cellobiohydrolase, cellobiose
GenCore: SEQ ID NO:1

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	SPOSATO, et al. Characterization and disruption of a gene in the maize pathogen Cochliobolus carbonum encoding a cellulase lacking a cellulose binding domain and hinge region. Mol. Plant. Microbe Interact. July-August 1995, 8(4):602-609; GenBank Accession No. U25129; abstract; pg 608, para 8	1, 4-6, 19 and 27-30 --- 3, 7-18, 20-26, 37-40 and 92
Y	LYND, et al. Microbial cellulose utilization: fundamentals and biotechnology. Microbiol. Mol. Biol. Rev. Sep 2002, 66(3):506-577; pg 508, para 5; pg 511, para 5; pg 515, para 3; pg 542, para 7; pg 557, para 1; Table 2	7-18, 20-26, 37-40 and 92
Y	US 6,979,733 B2 (ZHAO, et al.) 27 December 2005 (27.12.205); col 8, ln 20-23	3
A	KIKUCHI, et al. Collection, mapping, and annotation of over 28,000 cDNA clones from japonica rice. Science Jul 2003, 301(5631): 376-379; cDNA clone 002-168-D07; GenBank Accession Number AK110567.	1-30, 37-40 and 92
A	ALTSCHUL, et al. Basic local alignment search tool. J. Mol. Biol. October 1990 (5.10.1990); 215(3):403-410	3

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 February 2008 (28.02.2008)	08 APR 2008
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2007)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US 06/46919

Continuation of Box III: Observations where unity of invention is lacking (Continuation of item 3 of first sheet):

Groups 2-262: claims 1-30, 37-40 and 92, directed to a nucleic acid (claims 1-30), an expression cassette and expression vector, a transformed cell (claims 37-40), a method of producing a recombinant polypeptide (claim 92), wherein claims 1 and 2 are limited to SEQ ID NOs: 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43,45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 7 1, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, l0l, 103, 105, 107, 109, lll, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273,275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 3 19, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521 or 523, respectively.

Groups 263-524: claims 31-36, 104 and 125, directed to a nucleic acid probe, primer, a nucleic acid generated by utilization of said primers, wherein claim 32 are limited to having the sequence of SEQ ID NOs: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43,45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 7 1, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, l0l, 103, 105, 107, 109, lll, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273,275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 3 19, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521 or 523, respectively

Groups 525+: claim 41, directed to a transgenic animal comprising the sequence of claim 1. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 526+: claims 42, 43, 126 and 127, directed to a transgenic plant comprising the sequence of claim 1 or a method of making such a transgenic plant. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 527+: claims 44-47, directed to an anti-sense RNA hybridizing to the sequence of claim 1 or a method of RNA interference. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 528-789: claims 48-85, directed to a polypeptide of SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98,100, 102, 104, 106, 108, ll0, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 143, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 74, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 209, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406,408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522 or 524, respectively.

Groups 790+: claims 86, directed to an immobilized peptide of claim 48 or a nucleic acid of claims 1 or 31. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 791+: claim 87, directed to an array comprising an immobilized polypeptide or nucleic acid of claim 86. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 792+: claims 88-89, directed to a recombinant antibody that specifically binds to a polypeptide of claim 48. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 793+: claim 90, directed to a method for isolating a polypeptide with an oligomerase, cellulase or cellulolytic activity by means of the polypeptide binding to a specific antibody. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 794+: claim 91, directed to a polyclonal antibody hat specifically binds to a polypeptide of claim 48. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 795+: claim 93, directed to a method for identifying a peptide having an oligomerase, cellulase or cellulolytic activity. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 796+: claim 94, directed to a method for identifying a cellulase substrate. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 797+: claims 95-98, directed to a method for screening for a compound that specifically binds to a polypeptide of claim 48. Applicant is required to make a selection with regard to SEQ ID NO.

Group 798: claim 99-103, directed to a computer system or a method for processing amino or nucleic acid sequences.
Group 799: claims 106-112, directed to a method for mutagenesis of a nucleic acid of claim 1.

**********Continued on the following sheet**********

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 06/46919

Continuation of Box III and the preceding sheet:

Group 800: claim 113, directed to a method for producing a library of nucleic acids. Applicant is required to make a selection with regard of SEQ ID NO: to be searched.

Group 801: claims 114 and 115, directed to a method for making small molecules.
Group 802: claim 116, directed to a method for determining a functional fragment of a cellulase enzyme.
Group 803: claims 117, directed to whole cell engineering.

Group 804+: claims 118-123, directed to a recombinant signal or leader signal. Applicant is required to make a selection with regard of SEQ ID NO.

Groups 805+: claim 124, directed to thermostability via glycosylation. Applicant is required to make a selection with regard of SEQ ID NO.

Group 806+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 100, 96, 92.

Group 807+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 102, 96, 92.

Group 808+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 524, 96, 92.

Group 809+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 100, 96, 104.

Group 810+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 102, 96, 104.

Group 811+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 524, 96, 104.

Group 812+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 100, 96, 92.

Group 813+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 102, 96, 92.

Group 814+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 524, 96, 92.

Group 815+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 100, 96, 104.

Group 816+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 102, 96, 104.

Group 817+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 524, 96, 104.

Groups 818+: claim161, directed to a method for processing a biomass. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 819+: claim 162, directed to a chimeric polypeptide. Applicant is required to make a selection with regard to SEQ ID NO.

The inventions listed as groups 1-819+ do not relate to a single general inventive concept under PCT Rule 13.1 because according to PCT Rule 13.2, unity of invention exists only when the shared same or corresponding technical feature among the claimed inventions.

As to groups 1-262, each group has a different special technical feature not shared by the remaining groups. The claimed nucleic acids would be regarded as having the same or corresponding technical feature if they had a common property or activity, and shared a significant structural element that is essential to the common property or activity. While said nucleic acid do share the common property of encoding enzymes useful for processing a biomass material, they do not share a significant structural element, and hence, there is no disclosure of the same or corresponding technical feature. Therefore, unity of invention is lacking.

As to groups 1-819+, they do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2, unity of invention exists only when there is a shared same or corresponding special technical feature is a contribution over the prior art. The common special technical feature of said groups is an isolated nucleic acid having, for example, at least 50% sequence identity to SEQ ID NO:1. However, this is not an improvement over the article entitled "Collection, mapping, and annotation of over 28,000 cDNA clones from japonica rice" by KIKUCHI et al. (hereinafter "KIKUCHI") (Science 2003, 301(5631):376-379. KIKUCHI teaches a nucleic acid sequence (cDNA clone: 002-168-D07, Accession Number AK110567) having 58% identity to SEQ ID NO:1. Thus, the shared special technical feature cannot function as a novel technical feature to maintain unity of invention.

Claims 105, 128-154, 158, 159 have been found to be unsearchable under Article 17(2)(b) as not drafted in accordance with Rule 6.4(a) and being improper multiple dependent claims.

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
Gregory P. Einhorn
Morrison & Foerster LLP
12531 High Bluff Drive, Suite 100
San Diego, California 92130-2040

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	08 APR 2008
Applicant's or agent's file reference 564462014241	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US 06/46919	08 December 2006 (08.12.2006)	10 February 2006 (10.02.2006)

International Patent Classification (IPC) or both national classification and IPC
IPC(8) - C12N 9/42 (2008.01)
USPC - 435/209

Applicant Diversa Corporation

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer:
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	28 February 2008 (28.02.2008)	Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US 06/46919

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ the international application in the language in which it was filed.

   ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. type of material

      ☒ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ on paper

      ☒ in electronic form

   c. time of filing/furnishing

      ☒ contained in the international application as filed

      ☒ filed together with the international application in electronic form

      ☐ furnished subsequently to this Authority for the purposes of search

4. ☒ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 105, 128-154, 158 and 159

because:

☐ the said international application, or the said claims Nos. _____ relate to the following subject matter which does not require an international search *(specify)*:

☒ the description, claims or drawings *(indicate particular elements below)* or said claims Nos. 105, 128-154, 158, 159 are so unclear that no meaningful opinion could be formed *(specify)*:

Claims 105, 128-154, 158, 159 have been found to be unsearchable under Article 17(2)(b) as not drafted in accordance with Rule 6.4(a) and being improper multiple dependent claims.

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*:

☒ no international search report has been established for said claims Nos. 105, 128-154, 158, 159

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

- ☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.
- ☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rule 13*ter*.1(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See Supplemental Box for further details.

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has, within the appicable time limit:

   ☐ paid additional fees

   ☐ paid additional fees under protest and, where applicable, the protest fee

   ☐ paid additional fees under protest but the applicable protest fee was not paid

   ☒ not paid additional fees

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

   ☐ complied with

   ☒ not complied with for the following reasons:

This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is not complied with for the following reasons:

This application contains the following inventions or groups of inventions which are not so linked as to from a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group 1: claims 1-30, 37-40 and 92, directed to a nucleic acid (claims 1-30), an expression cassette and expression vector, a transformed cell (claims 37-40), a method of producing a recombinant polypeptide (claim 92), wherein claims 1 and 2 are limited to SEQ ID NO:1

Groups 2-262: claims 1-30, 37-40 and 92, directed to a nucleic acid (claims 1-30), an expression cassette and expression vector, a transformed cell (claims 37-40), a method of producing a recombinant polypeptide (claim 92), wherein claims 1 and 2 are limited to SEQ ID NOs: 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43,45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 7 1, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, I0I, 103, 105, 107, 109, III, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273,275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 3 19, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521 or 523, respectively.

Groups 263-524: claims 31-36, 104 and 125, directed to a nucleic acid probe, primer, a nucleic acid generated by utilization of said primers, wherein claim 32 are limited to having the sequence of SEQ ID NOs: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43,45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 7 1, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, I0I, 103, 105, 107, 109, III, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273,275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 3 19, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521 or 523, respectively.

Groups 525+: claim 41, directed to a transgenic animal comprising the sequence of claim 1. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 526+: claims 42, 43, 126 and 127, directed to a transgenic plant comprising the sequence of claim 1 or a method of making such a transgenic plant. Applicant is required to make a selection with regard to SEQ ID NO.

**********See Supplemental Box**********

4. Consequently, this opinion has been established in respect of the following parts of the international application:

   ☐ all parts

   ☒ the parts relating to claims Nos. Group I - claims 1-30, 37-40 and 92, limited to SEQ ID NO:1

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Box No. V **Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	2, 3, 7-18, 20-26, 37-40 and 92	YES
	Claims	1, 4-6, 19 and 27-30	NO
Inventive step (IS)	Claims	2	YES
	Claims	1, 3-30, 37- 40 and 92	NO
Industrial applicability (IA)	Claims	1-30, 37-40 and 92	YES
	Claims	None	NO

2. Citations and explanations:

Claims 1, 4-6, 19, and 27-30 lack novelty under PCT Article 33(2) as being anticipated by the article entitled "Characterization and disruption of a gene in the maize pathogen Cochliobolus carbonum encoding a cellulase lacking a cellulose binding domain and hinge region" by Sposato et al. (hereinafter "Sposato").

As to claims 1 and 4, Sposato teaches an isolated recombinant nucleic acid comprising (a) a nucleic acid sequence having at least 53% complete sequence identity to SEQ ID NO:1 over a region of at least about 1150 or more residues, wherein the nucleic acid encodes a polypeptide having a cellobiohydrolase activity (abstract; GenBank Accession No. U25129), and the sequence identities are determined by analysis with a sequence comparison algorithm.

As to claims 5-6, Sposato does not teach that the oligomerase activity comprises hydrolyzing (degrading) soluble oligomers to fermentable monomeric sugars, including xyose, arabinose, and glucose. However, this property is inherent in the structure of the nucleic acid of SEQ ID NO:1, because Sposato teaches the claimed structure.

As to claim 19, Sposato does not teach that the cellulase activity comprises catalyzing hydrolysis of internal beta-1,3-glucosidic linkages. However, this property is inherent in the structure of the nucleic acid of SEQ ID NO:1, because Sposato teaches the claimed structure.

As to claims 27-30, Sposato does not teach that the cellulase activity is thermostable or thermotolerant, wherein the polypeptide retains a cellulase activity under the recited conditions. However, this property is inherent in the structure of the nucleic acid of SEQ ID NO:1, because Sposato teaches the claimed structure.

Claim 3 lacks an inventive step under PCT Article 33(3) as being obvious over Sposato, as above, in view of US 6,979,733 B2 to ZHAO, et al. (hereinafter "Zhao").

As to claim 3, Sposato teaches the isolated recombinant nucleic acid of claim 1 (see explanation above), but does not teach the sequence comparison algorithm is a BLAST version 2.2.2 algorithm where a filtering setting is set to blastall .p blastp .d "nr pataa" -F F, and all other options are set to default. Zhao teaches a BLAST version 2.2.2 algorithm where a filtering setting is set to blastall -p blastp -d "nr pataa" -F F, and all other options are set to default (col 8, ln 20-23). Thus, for one of ordinary skill in the art it would have been a matter of experimental design to use the claimed algorithm in order to achieve optimal sequence alignment.

Claims 7-18, 20-26, 37-40, and 92 lack an inventive step under PCT Article 33(3) as being obvious over Sposato, as above, in view of the article entitled "Microbial cellulose utilization: fundamentals and biotechnology" by Lynd et al. (hereinafter "Lynd").

As to claims 7 and 22-26, Sposato teaches the isolated recombinant nucleic acid of claim 1, which is a cellobiohydrolase (abstract). Sposato does not teach that the cellulase activity comprises hydrolyzing (degrading) plant biomass polysaccharides. Lynd teaches that cellobiohydrolase activity comprises hydrolysis of plant biomass polysaccharides ("cellulose, such as cellulose in wood or cereal-basted feedstock such as barley straw or wheat strat," pg 508, para 5; pg 511, para 5; pg 542, para 7; Table 2). It thus would have been obvious to one of skill in the art that the cellobiohydrolase taught by Sposato would be capable of hydrolysing plant biomass polysaccharides, because both enzymes are members of the same enzymatic family (i.e., cellobiohydrolases).

As to claim 8, Sposato teaches the isolated recombinant nucleic acid of claim 1, which is a cellobiohydrolase (abstract). Sposato does not teach that the cellulase activity comprises hydrolyzing a glucan to produce a smaller molecular weight polysaccharide. Lynd teaches that cellobiohydrolase activity comprises hydrolysis of a glucan (cellulose) to produce a smaller molecular weight polysaccharide (cellobiose, pg 511, para 5). It thus would have been obvious to one of skill in the art that the cellobiohydrolase activity of Sposato would comprise hydrolysis of a glucan to produce a smaller molecular weight polysaccharide, because both enzymes are members of the same enzymatic family (i.e., cellobiohydrolases).

**********Continued in Supplemental Box**********

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 5-6, 19, and 27-30 are not supported by the disclosure. The disclosure teaches that the polypeptide encoded by SEQ ID NO:1 is a cellobiohydrolase (Table 3, page 182), but there is no disclosure with regard to the activity or thermostability of the polypeptide.

Claims 14-18 lack clarity because they recite that the cellulase or oligomerase activity comprises catalyzing glucanase linkages. However, glucanase refers to the enzyme class that itself catalyzes said hydrolysis, and does not refer to the linkages themselves. For the purposes of the search, claims 14-18 were interpreted as referring to "glycosidic linkages," not to "glucanase linkages."

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:
Box V. 2. Citations and Explanations:

As to claims 9, 14, and 15, Sposato teaches the isolated recombinant nucleic acid of claim 1, which is a cellobiohydrolase (abstract). Sposato does not teach that the cellulase activity comprises catalyzing hydrolysis of 1,4-beta-D-glycosidic linkages. Lynd teaches that cellobiohydrolase activity comprises 1,4-beta-D-glucan hydrolase activity (pg 511, para 5). It thus would have been obvious to one of skill in the art that the cellobiohydrolase activity of Sposato would comprise catalyzing hydrolysis of 1,4-beta-D-glycosidic linkages, because both enzymes are members of the same enzymatic family (i.e., cellobiohydrolases).

As to claims 10-11 and 16, Lynd teaches that the 1,4-beta-D glycosidic activity of a cellobiohydrolase comprises endocellulase (endoglucanse) activity, which comprises hydrolysis of a 1,4-beta-D-endoglycosidic linkage in a cellulose (pg 515, para 3).

As to claimz 12-13, Lynd teaches that the hydrolysis of a 1,4-beta-D-endoglycosidic linkage is in a cellulose derivative (carboxy methyl cellulose) or a cereal (barley straw or wheat straw) comprising a beta-D-glucan (pg 508, para 5; pg 511, para 5; Table 2).

As to claims 17-18, Lynd does not teach that the hydrolysis of endo-glycosidic linkages comprises catalyzing hydrolysis of endo-1,4-beta-D -glucan linkages via 4-glucano hydrolase activity. However, Lynd teaches that cellobiohdrolases comprise endoglucanase activity which catalyze hydrolysis of internal endo-beta-1,4-glycosidic linkages (pg 511, para 5; pg 515, para 3), and that other types of endoglucanases comprise 4-glucano hydrolase activity (pg 511, para 5). It thus would have been obvious to one of skill in the art that the cellobiohydrolase activity of Sposato would comprise catalyzing 4-glucano hydrolase activity, because both enzymes are members of the same enzymatic family (i.e., cellobiohydrolases).

As to claims 20-21, Sposato teaches the isolated recombinant nucleic acid of claim 1, which is a cellobiohydrolase (abstract). Sposato does not teach that the cellulase activity comprises hydrolyzing polysaccharides comprising 1,4-beta-glycoside-linked D-glucopyranose. Lynd teaches that cellobiohydrolase activity comprises 1,4-beta-D-glucanase activity, and that cellobiohydrolase can hydrolize polysaccharides comprising glucopyranose (pg 511, para 5; pg 557, para 1). It thus would have been obvious to one of skill in the art that the cellobiohydrolase activity of Sposato would comprise hydrolyzing polysaccharides comprising 1,4-beta-glycoside-linked D-glucopyranose, because both enzymes are cellobiohydrolases.

As to claims 37-40, Sposato teaches a plasmid comprising the disclosed nucleic acid (pg 608, para 8), but does not teach an expression cassette, expression vector, cloning vehicle comprising a plasmid, or cell comprising any of same, comprising said nucleic acid. Lynd teaches expression cassettes, expression vectors (plasmids), and yeast cells comprising a cellobiohydrolase (pg 557, para 1). It would have been obvious to one of skill in the art to include the nucleic acid of Sposato in such expression cassettes, expression vectors (including plasmids), and yeast cells, because expression of nucleic acids using expression vectors, cassettes, plasmids, and yeast cells was routine in the art.

As to claim 92, Sposato teaches the isolated recombinant nucleic acid of claim 1, which is a cellobiohydrolase (see explanation above). Sposato does not teach a method of producing a recombinant polypeptide comprising the recited steps. Lynd teaches a method of producing a recombinant cellobiohydrolyase, comprising:
(a) providing a nucleic acid operable linked to a promoter, wherein the nucleic acid comprises a cellobiohydrolase; and
(b) expressing the nucleic acid of step (a) under conditions that allow expression of the polypeptide, thereby producing the recombinant polypeptide, wherein optionally the method further comprises transforming a host cell with the nucleic acid of step (a) followed by expressing the nucleic acid of step (a), thereby producing a recombinant polypeptide in a transformed cell (pg 557, para 1).

Claim 2 meets the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a nucleic acid comprising the sequence of SEQ ID NO:1.

Claims 1-30, 37-40 and 92 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used in industry.

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Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box IV. Lack of Unity of Invention:

Groups 527+: claims 44-47, directed to an anti-sense RNA hybridizing to the sequence of claim 1 or a method of RNA interference. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 528-789: claims 48-85, directed to a polypeptide of SEQ ID NOs: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98,100, 102, 104, 106, 108, lI0, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 143, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 74, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 209, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406,408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522 or 524, respectively.

Groups 790+: claims 86, directed to an immobilized peptide of claim 48 or a nucleic acid of claims 1 or 31. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 791+: claim 87, directed to an array comprising an immobilized polypeptide or nucleic acid of claim 86. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 792+: claims 88-89, directed to a recombinant antibody that specifically binds to a polypeptide of claim 48. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 793+: claim 90, directed to a method for isolating a polypeptide with an oligomerase, cellulase or cellulolytic activity by means of the polypeptide binding to a specific antibody. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 794+: claim 91, directed to a polyclonal antibody hat specifically binds to a polypeptide of claim 48. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 795+: claim 93, directed to a method for identifying a peptide having an oligomerase, cellulase or cellulolytic activity. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 796+: claim 94, directed to a method for identifying a cellulase substrate. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 797+: claims 95-98, directed to a method for screening for a compound that specifically binds to a polypeptide of claim 48. Applicant is required to make a selection with regard to SEQ ID NO.

Group 798: claim 99-103, directed to a computer system or a method for processing amino or nucleic acid sequences.
Group 799: claims 106-112, directed to a method for mutagenesis of a nucleic acid of claim 1.

Group 800: claim 113, directed to a method for producing a library of nucleic acids. Applicant is required to make a selection with regard of SEQ ID NO: to be searched.

Group 801: claims 114 and 115, directed to a method for making small molecules.
Group 802: claim 116, directed to a method for determining a functional fragment of a cellulase enzyme.
Group 803: claims 117, directed to whole cell engineering.

Group 804+: claims 118-123, directed to a recombinant signal or leader signal. Applicant is required to make a selection with regard of SEQ ID NO.

Groups 805+: claim 124, directed to thermostability via glycosylation. Applicant is required to make a selection with regard of SEQ ID NO.
Group 806+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 100, 96, 92.

Group 807+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 102, 96, 92.

Group 808+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 524, 96, 92.

Group 809+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 100, 96, 104.

Group 810+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 102, 96, 104.

**********Continued in the following Supplemental Box**********

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:
Box IV. Lack of Unity of Invention:

Group 811+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 34, 98, 94, 524, 96, 104.

Group 812+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 100, 96, 92.

Group 813+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 102, 96, 92.

Group 814+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 524, 96, 92.

Group 815+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 100, 96, 104.

Group 816+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 102, 96, 104.

Group 817+: claims 155-157,160, 163, directed to a composition or a product of manufacture, wherein claim 156 is limited to SEQ ID NOs: 106, 46, 98, 94, 524, 96, 104.

Groups 818+: claim161, directed to a method for processing a biomass. Applicant is required to make a selection with regard to SEQ ID NO.

Groups 819+: claim 162, directed to a chimeric polypeptide. Applicant is required to make a selection with regard to SEQ ID NO.

The inventions listed as groups 1-819+ do not relate to a single general inventive concept under PCT Rule 13.1 because according to PCT Rule 13.2, unity of invention exists only when the shared same or corresponding technical feature among the claimed inventions. As to groups 1-262, each group has a different special technical feature not shared by the remaining groups. The claimed nucleic acids would be regarded as having the same or corresponding technical feature if they had a common property or activity, and shared a significant structural element that is essential to the common property or activity. While said nucleic acid do share the common property of encoding enzymes useful for processing a biomass material, they do not share a significant structural element, and hence, there is no disclosure of the same or corresponding technical feature. Therefore, unity of invention is lacking.

As to groups 1-819+, they do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2, unity of invention exists only when there is a shared same or corresponding special technical feature is a contribution over the prior art. The common special technical feature of said groups is an isolated nucleic acid having, for example, at least 50% sequence identity to SEQ ID NO:1. However, this is not an improvement over the article entitled "Collection, mapping, and annotation of over 28,000 cDNA clones from japonica rice" by KIKUCHI et al. (hereinafter "KIKUCHI") (Science 2003, 301(5631):376-379. KIKUCHI teaches a nucleic acid sequence (cDNA clone: 002-168-D07, Accession Number AK110567) having 58% identity to SEQ ID NO:1. Thus, the shared special technical feature cannot function as a novel technical feature to maintain unity of invention.

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article," "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Volume I/A, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that amendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

What parts of the international application may be amended ?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

(i) the claim is unchanged;
(ii) the claim is cancelled;
(iii) the claim is new;
(iv) the claim replaces one or more claims as filed;
(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers, claims 30, 33 and 36 unchanged; new claims 49 to 51 added."

2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."

3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."

4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

If a demand for international preliminary examination is made, the written opinion of the International Searching Authority will, except in certain cases where the International Preliminary Examining Authority did not act as International Searching Authority and where it has notified the International Bureau under Rule 66.1*bis*(b), be considered to be a written opinion of the International Preliminary Examining Authority. If a demand is made, the applicant may submit to the International Preliminary Examining Authority a reply to the written opinion together, where appropriate, with amendments before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later (Rule 43*bis*.1(c)).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see the *PCT Applicant's Guide*, Volume II.